The integration of project competences within the post-graduate programme: a case study of the International Masters in Rural Development
AGRIS MUNDUS

Ignacio de los Ríos Carmenado[a], José María Díaz-Puente[a] *, José Luis Yagüe Blanco[a]

[a]*Technical University of Madrid, Escuela Técnica Superior de Ingenieros Agrónomos, Avenida Complutense s/n., Madrid,28040 Spain*

Abstract

Experiences relating to the International Masters in Rural Development from the Technical University of Madrid (*Universidad Politécnica de Madrid*, UPM), the first Spanish programme to receive a mention as a Registered Education Programme by the International Project Management Association (IPMA) are considered. Backed by an educational strategy based on Project-Based Learning dating back twenty years, this programme has managed to adapt to the competence evaluation requirements proposed by the European Space for Higher Education (ESHE). In order to do this the training is linked to the professional qualification by using competences as a reference leading to the qualification in project management as established by the IPMA.

Keywords: Competences; Project Management; ESHE; Project-Based Learning; Educational Innovation

1. Introduction

In 1987 a methodology based on professional competences was initiated for students studying the fifth year of the degree course within the Higher Technical School of Agricultural Engineering (ETSIA) at the Technical University of Madrid (UPM). The starting point was a collaborative agreement between the Department of Projects and Rural Planning at the School of Agronomic Engineering and the regional government of Madrid in order to carry out studies and development projects within that territory. The projects developed during the following twenty years served as a base to consolidate a focus on Project-Based Learning (PBL) which has demonstrated how to integrate the technical, personal and contextual competences required to address real problems within the teaching of Projects (Cazorla & De los Ríos, 1998).

Throughout twenty years of development, the experience of PBL by three important phases incorporating methods, activities and support structures (De los Ríos I., Cazorla, Díaz-Puente, & Yagüe, 2010). In this way, from an initial teaching method of a logical package of procedures tending to direct student learning (Sánchez Nuñez, 1996), there has been a move towards the bringing together of various methods —intuitive, comparative, deductive, case study, problem-solving— (Cazorla & De los Ríos, 1996) and different activities —master classes, group

activities, cooperative learning, work time in and out of the faculty buildings, virtual and face-to-face tutorials, project presentations, competitions between project teams, etc.—. At the same time lines of applied investigation were linked together in order to complement the academic work and widen the reach of postgraduate studies. This situation has led to a substantial change, moving from dealing with independent subjects to forming an educational strategy directed towards competences in Project Management (De los Ríos I., Cazorla, Díaz-Puente, & Yagüe, 2010) and linked to a Rural-Local Sustainable Development Planning and Management research group (GESPLAN-UPM).

The latest strategy development phase was fully introduced within the process of adaptation of the university to the European Space for Higher Education (ESHE). Taking up the challenge to contribute to the transformation of the European Union into a more competitive and dynamic knowledge-based society (European Commission, 2001), the ESHE requires new models of educational innovation to be based on competences and aptitudes and implies new subject design and learning objectives, which have as much impact on teaching-learning methodologies as they have on evaluation. These new challenges and changes are laid out in various EU agreements, figuring among which the "Sorbonne Declaration", 1998 (Allegre, Berlinguer, Blackstone, & Rüttgers, 1998), the " Bologne Declaration", 1999 (European Commission, 1999), the "Lisbon European Council 2000" (European Council, 2000) and the "Berlin Declaration" (European Commission, 2003).

Within this context of change the idea of life-long learning (European Commission, 2001) emerged, understood to cover all learning activities undertaken throughout a person's lifetime with the objective of improving knowledge, competences and aptitudes given a personal, civic, social or employment perspective (European Commission, 2000). The integration of professional competences and evaluation of competences is a requirement which must be adopted by current educational programmes.

The different theoretical approaches to the origins of professional competences (De los Ríos, Guerrero, Díaz-Puente, 2008), and in particular those in the field of project management (De los Ríos, Ortiz Marcos, Díaz-Puente, 2008) allow the identification of the models exerting the greatest international influence within this area of knowledge. Of the two most important, the universal certification of professional competences model 4LC of the International Project Management Association (IPMA, 2008) presents various aspects of great interest: it clearly states its orientation towards competences as an instrument dedicated to the increase in employability of project management professionals, and secondly it came about through consensus and agreement between the European professional associations and as a consequence is infused with the philosophy of the ESHE, and finally it is significant internationally, currently encompassing almost 50 countries throughout the world.

Figure 1 shows the educational strategy of the GESPLAN-UPM integrated within a four-level scheme similar to the IPMA certification model. It provides the students with gradual and growing education while increasing their knowledge and attitudes as they move along this educational "pathway", giving them opportunities to acquire some basic experience beforehand, and beginning with graduate projects.

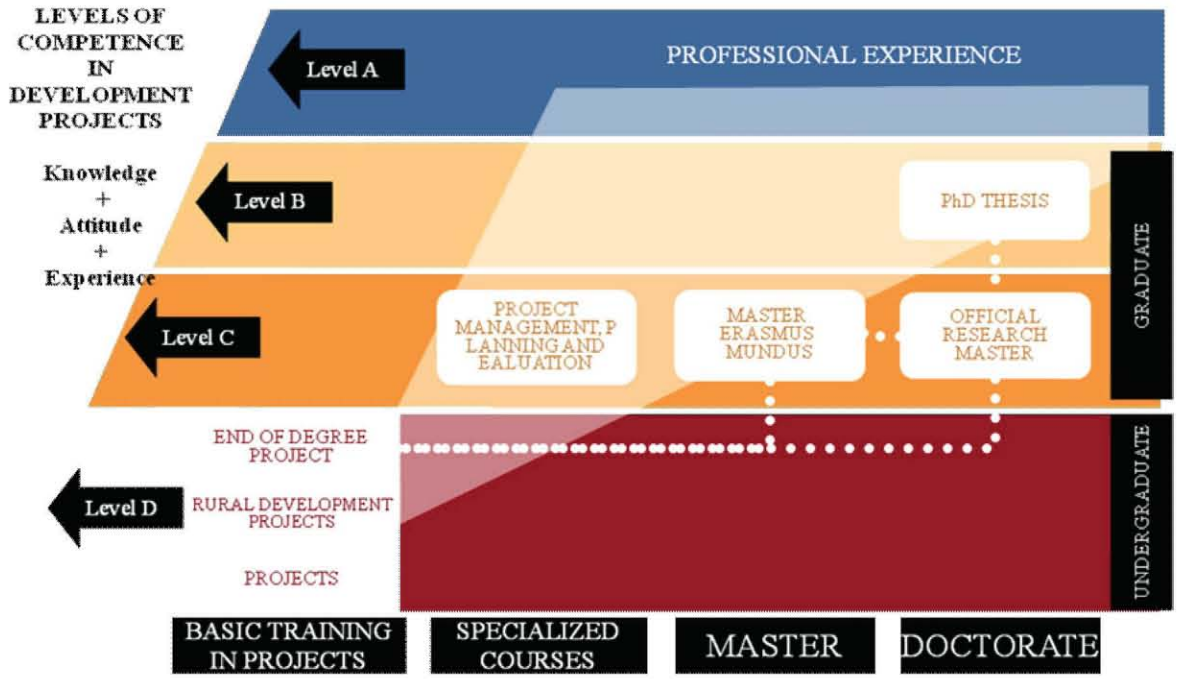

Figure 1: Educational strategy in relation to Project Management competences.

Standing out among the integrated factors are the links between education and the professional qualification, the evaluation of competences –technical, contextual and of personal behaviour – from the techniques of PBL (Project Based Learning) (Bartkus K. R., 2001), the connection of the students with real problems, cooperative learning, mobility, and the integration of education and applied research. (ECOTEC, 2009).

In this paper the experience relating to the International Masters in Rural-Local Development is presented, fed by its own educational evolutionary dynamic in order to adapt its educational programme and be recognized within the professional competence standards set out by the IPMA. This Masters programme (from here on in MIDRL-AM) in its turn forms a part of the programme Agris Mundus, recognized by the European Union as Erasmus Mundus, in which six European universities participate, and thus deserving of the highest level of academic recognition at a European level.

2. The registration process for educational programmes under the powers of the IPMA

The universal certification of professional competences model 4LC of the IPMA is applied in 50 countries via the respective national certification organizations and it is based on the ICB3-IPMA Competence Baseline V3 and on National Competence Baseline V3, NCB3. Currently there are fifteen NCB3 documents written in fifteen different languages, all of which are organized around three competence areas (technical, personal and contextual) and the 46 competence elements of the ICB3.

This model has been implanted in Spain since 1999, and is managed by the Project Management Certification Organism (OCDP) of the Spanish Association of Project Engineering (AEIPRO), a national association integrated in the IPMA. This organism has been accredited by the National Accreditation Body (ENAC) in accordance with the established norms defining what requisites can be called for from those organisms granting people certification (ISO/IEC:17024, 2003).

In this section the steps that must be taken for the integration of the IPMA professional within educational programmes are outlined. This integration includes a verification process to ensure that the programmes comply

with the criteria laid out for its inclusion in the Inscription System within the certification model. The phases of the process are summarised in figure 2.

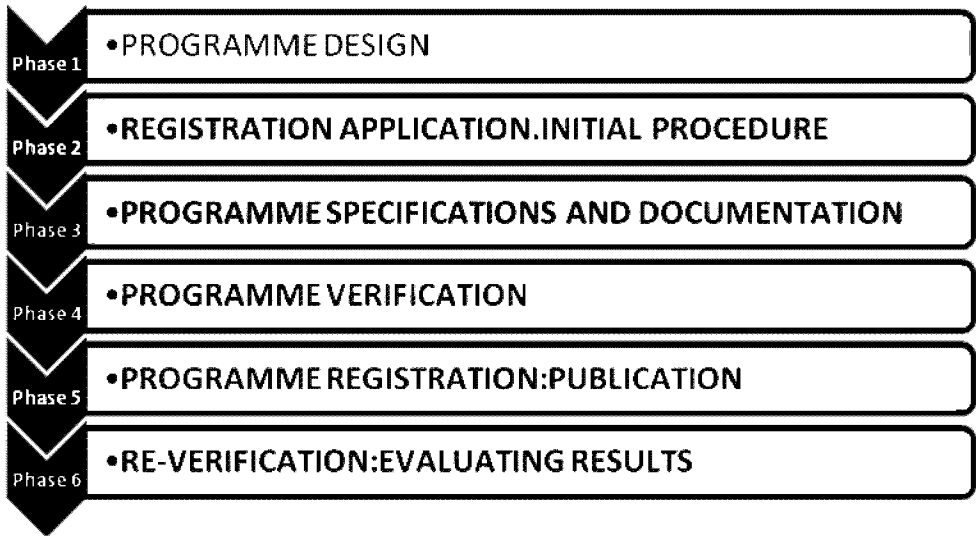

Figure 2: Phases in the verification process for the registration of educational programmes

2.1. Design of the educational programme

The first step is the design of the educational Programme based on the IPMA competences. This design process must include the following stages: a) a definition of the common objectives shared between the participating educational teams under the ESHE and the IPMA competences.; b) the elaboration of norms and common concepts which clarify the learning and evaluating process with respect to the competences; c) a determination of which competences are to be included in the educational programme; d) a design of the organizational means and the common instruments between the participating teams; e) measures in order to implement the programme; f) a system to evaluate and guarantee quality.

2.2. Initial evaluation: Verification of the integration of competences

Once the educational programme has been designed, it is submitted to a process of evaluation in order to verify its coherence and adequate design with respect to the IPMA competences, integrating various technical, contextual and behavioural elements. This process is oriented towards confirming that the proposed Programme complies with the criteria necessary for its inclusion within the Inscription System for Associate Members (AM) of the IPMA.

In order to begin the process of registration it is necessary to apply to become a member of an Associate Member of the IPMA. In principle anybody organizing a Project Management Educational Programme can initiate this registration process, irrespective of nationality, or public or private status.

Based on a series of public verification criteria, the application is scrutinized by the Association, and approval to continue with the process of programme registration is granted or refused. In the case of refusal a written explanation outlining the reasons for the decision is issued. The system must be without prejudice within the country's market and must not, for example, favour the development of specific organizations or an educational monopoly.

The admissions procedure for programmes must be published in each country by the organisms or Associate Members of the IPMA. Some of the general criteria being established for Associate Members relating to the initial verification of programmes are the following:

- Dealing with project management and administration
- They must focus on achieving an improvement in determined competences
- They must cover a significant number of the NCB competence elements
- They must integrate behavioural competences, together with the appropriate technical competences of the programme.
- They must guarantee the separation between education and the subsequent certification process.
- They must have been promoted and executed ethically.
- They must maintain an open system, so that the competences can be validated from the professional field.
- They must verify the programme's influence, prestige and credibility within the professional market.

2.3. Specification and Documentation of the programme

On acceptance of the application, the AM sends a form summarizing the information required in order to continue with the registration procedure and begin the process of verification and evaluation of the educational programme. This second process is carried out by the staff of the registering body of the AM in cooperation with at least one verifier from the IPMA. The Associate Members must establish the tools required for the evaluation of these applications. After the evaluation the application can be rejected, postponed or accepted. If the application is rejected, the AM must inform the organizing body of the reasons.

For the programme specification the organizing body must send a detailed description of the programme to the AM including: a) a description of the programme design and structure, b) an auto-evaluation of the programme based on the NCB elements, and c) the programme material and the quality guarantee system.

2.3.1. Description of the programme structure

An organigram which presents an overview of the structure of the programme must be provided, indicating subject contents by educational module session in class, and by weeks or months for practicals, if it is the case that they form a part of the programme. This organigram of the Project structure is the base from which the programme organizer calculates the number of hours dedicated to the different NCB elements. The organigram gives the verifiers and potential participants an initial overview of the duration and character of the programme. It is convenient that the organigram is posted on the web pages of the Associate Member and the organizer in order to provide information for potential users. For short or medium-length programmes the organigram should be divided up into half-day or full-day sessions, and for large programmes each session will last longer.

2.3.2. Auto-evaluation of the programme

Other necessary information which must be presented to the AM is the "Planning based on the NCB elements" This planning (Table 1) must clarify which of the elements are covered in the educational programme and to what degree. It is necessary that the organizer is familiar with the NCB elements in order to carry out this auto-evaluation.

Table 1. Planning Format based on the NCB competence elements

(1) NCB competence element	(2) Level of objective contained				(3) Duration (hours)	(4) Educational Activity (Metodology)				(5) Additional Information for verification
	Level3	Level 4	Level 5	Level 6		Class	Group	Tutorial	Practical	
Element 1.01										
Element 1.02										

NCB competence elements:The 46 NCB competence elements are taken initially, although if it is deemed to be necessary additional elements may be included.

Total duration of the course (workload): A total of hours dedicated to the distinct educational activities. The information by hours helps to verify the cited learning level.

Educational Methodology: At least four of the previously mentioned methods should be included (master classes, group work, tutorials, practicals). It is useful to indicate the number of hours dedicated to each activity type. This breakdown helps to verify the level objective, and also gives more information about the type of programme being presented.

Additional information: This is to give extra information to help with the verification of the course with respect to the competence element, for example with references to the teaching materials, bibliographies, etc.

Level of objective: Content which is considered necessary for the development of the competence, using a four-column sub-division. In order to evaluate each competence element the same evaluation scale as the Associate Member of the IPMA must be used. To unify the criteria in accordance with the IPMA and with the objective of indicating the level of opportunities for improving the competence, the programme organizer must use the same evaluation scale levels (3, 4, 5 and 6) for each competence element covered. The numbers must correspond to the values 3, 4, 5 and 6 on the 0 to 10 evaluation scale which forms a part of the NCB of the Associate Members.

In Table 2 is the scale proposed by AEIPRO in order to indicate the level of learning objective to integrate the technical and contextual competences within programmes.

In Table 3 a scale to indicate the level of learning objective to integrate behavioural competences can be seen.

The scale of the Associate Member must be applied by the programme organizer and is a basic instrument in the planning of a programme based on the NCB elements. The using of a common evaluation scale helps to compare programmes and helps users to select that which most closely meets their demands in order to obtain he IPMA certificate. The scale is limited to the four most typical levels that can be reached through the participation in a long or short course. In addition, the limit of four levels tries to simplify the scoring process and communication with potential participants.

Table 2: Scale to indicate the level of learning objectives

Technical and contextual competences		
Level	**Knowledge of Methods**	**Practical application**
3	Knows of the existence and name of a method. Is capable of describing a few steps of the process or its application.	Can recognize the method with some hesitation when seen. Can memorize impressions of having participated involved in non-complex projects.
4	Understands the concept and use of a version of the method Knows the majority of the steps of the process or its application..	Can easily recognize the method when seen. Is to a lesser extent capable of analysing situations in non-complex projects and applying the individual method adequately.
5	Understands a number of versions of the methods. Knows the processes for applying the most important methods. Knows simple criteria to help choose between the methods to use.	Can distinguish between the known methods. Can analyse non-complex situations and is capable of selecting which method to apply and describe the majority of the consequences of its use. Can organize the application through involving others.
6	A solid understanding of various versions of the methods. Knows the steps for the application of those methods. Knows some criteria for the advantageous use of each method and can describe the most important consequences of its application.	Can analyse complex situations in projects and is then capable of choosing between methods and combining versions. Can describe how the application of methods will impact on Project and solve problems. Can organize the application through involving many parts in complex projects.

Table 3: Scale to indicate the level of learning objectives

Behavioural competences		
Level	**Knowledge and attitude**	**Behaviour and abilities**
3	Knows aspects of good leadership and has some awareness of his own abilities. Accepts the role of leader and the need to improve his own behaviour.	Capable of contributing to the leadership functions in projectsin a visible way (under relatively favourable conditions), although sometimes without success.
4	Is aware of his own capacities and is capable of "seeing" part of his own behaviour as leader of others in specific situations. Accepts the crucial role of behaviour and knows several methods for improving it.	Capable of contributing in order to actively extend the leadership functions in projects (under slightly difficult conditions). Rarely employs means to improve his own behaviour.
5	Shows clear awareness of his own capacities and is generally capable of recognizing leadership behaviour in himself and others, or the lack of some behaviour in determined situations. Knows methods for improving his own behaviour.	Capable of performing with good leadership behaviour in extensive projects and under difficult conditions. Capable of seeing when to use methods to improve his own behaviour.
6	Shows deep awareness of his own capacities and is capable of seeing leadership behaviour in himself and others, or the lack of some behaviour in many situations. Knows various methods for improving his own behaviour and that of others.	Capable of almost always performing good leadership behaviour in various ways in projects, under difficult conditions and against resistence. Is capable of frequently using means to improve his own behaviour and that of others.

2.3.3. Programme material and a system to guarantee quality

The organizer must, in addition, submit the specific material provided for the programme specification and all material already existing relating to the programme; promotional material, education manual (educational programme timetable), applied bibliography, the CVs of the principal course leaders, the system of evaluation and the evaluation report relating to the latest running of the programme.

2.4. Programme verification

The process of verification of the programme information is carried out by "verifiers" designated by the Associate Member. For each programme at least two verifiers are designated, and the organizers must allow the verifiers to get to know the programme content quality and delivery in depth. All material supplied by the organizer must be treated with the highest degree of confidentiality. The work of the verifiers consists only in evaluating the reliability of the information which will be subsequently published via the Associate Member. The verification covers the scope and level of the programme, but not the quality of the results of the programme.

The information published by the AM is usually limited to the following aspects: the scope of the programme (NCB elements covered and any additional competence elements), the level at which the competence elements are treated; and other general information about the programme (duration, cost, etc.).

The verifiers must as a minimum check the material supplied and hold a meeting with the organizer in order to obtain additional information. The role of the verifiers consists only in evaluating the validity of the submitted information, without imposing changes to the programme. However, these verifier-organizer meetings allow advice on possible adjustments to the programme design and provide feedback to the organizer in order to improve certain aspects (the current scope, the level of the objectives, content and form of the programme, etc.).

The verifiers can also decide if it is necessary to apply additional instruments to the process of programme verification. To this end the verifiers must bear in mind that the process is directed towards an improvement in the transparency of the education market thanks to the registration system and to the verification of the information submitted by each organizer. It is also important that the verifiers know and apply the international standard ISO 17021, covering educational materials and methods, and ISO 17024, which offers a standard for educators.

The selection of verifiers by the Associate Member is essential in order to forge and maintain credibility around the Registration System. The credibility and requirements to be a verifier must be documented. These requirements are: having vast experience in project management; having a deep knowledge of the NCB competences of the Associate Member and their application; possessing a wide spectrum of educational methods and their application; being open to new proposals relating to project management and educational innovation. In Table 4 the steps and instruments in the verification of the registration process are shown.

2.5. Programme registration and agreement with the organizer

Finally, if the verification is positive, the programme is accepted for registration and publication by the Associate Member. In this case a formal agreement between the Association and the programme organizer is signed. Among other things, this agreement must establish: the responsibility of the Associate Member to present the information and to keep the organizer informed regarding any change to the system.; the entire responsibility of the organizer for the presented information(even though this information has been checked by the Associate Member); the responsibility of the organizer to keep the programme information up to date; the timescale and selection of when the programme is to be re-verified.; the Associate Member criteria for suspending the agreement in the case of misuse of the logo. The Associate Member operating the Registration System must allow and ensure that the organizer can appeal to a neutral body in the case of rejection or the existence of significant disagreement regarding the programme planning.

Table 4: Instruments in the registration process verification

Stages and instruments in during the verification			
Stage	Description	Level of requirement	Typical verifier questions/requests
Documentation of specific material	Preliminary material check	Obligatory	Has the requested material been supplied? Does it need to be expanded?
	Expanded application	Obligatory	Do the primary and secondary objectives correspond to the planning? Is evaluation used in order to improve?
	Programme organigram	Obligatory	Is there consistency between objectives, duration and methods? Does the programme help in the application of the learning from within the classes?
	Planning based on the NCB elements	Obligatory	Is there consistency in the treatment of elements? Is there consistency between level, duration and method?
Documentation of the organizer's additional material	Promotional material for the programme including web page	Obligatory	Is there consistency with the application, organigram and planning?
	Programme educational material	Sample check	Is there consistency between the levels of the selected NCB elements and the applied material?
	Course leaders CV's	Sample check	Is the profile of the course leaders adequate in order to deliver the course?
	Evaluation of previous editions of the course	Sample check	Is there consistency between the evaluations, the objectives and the planning?
	List of questions and additional planning instruments	Obligatory	The verifiers will put together any outstanding matters requiring clarification. They may ask for more material. They may select additional initiatives.
Optional additional instruments	Ask questions to previous participants	Optional	Are questionnaires sent to participants? Are participants requested to check the planning? Are participants interviewed?
	Auto-evaluation of the course leaders based on the NCB	Opcional	Does it reflect the way in which a full understanding of the NCB has been achieved? Does the level of marks confirm the competence necessary for the course?
	Visit during part of the next course	Optional	The verifiers will seek a general impression and/or check specific levels or elements.
	Attend the entire course	Optional	In the case of there being many outstanding matters.
Meeting with the organizer, including course leaders	Check the expanded application	Obligatory	Deal with those changes to the application which are to be published.
	Planning check	Obligatory	Deal with changes in elements or levels.
	Conclusion and agreement	Obligatory	Reach a decision over registration. Sign an agreement between the Associate Member and the organizer.
	Feedback and simulated participation	Optional	The verifiers present their observations regarding the process. The verifiers act as participants in order to cover matters proposed by the organizer

3. Experiences with the International Masters in Rural Development – Agris Mundus

The general objective of this programme is based around validating the competence of individuals with respect to their knowledge, experience and attitudes in relation to Rural-Local Development Project and Programme Management.

The international dimension of the programme is reinforced in two ways: firstly by forming a part of the international organization NATURA "Network of European Agricultural" related with rural development , and created in October, 1988 in Louvain-Belgium. This association develops systematic actions within the field of development programmes. Secondly, since 2006, the programme has reinforced its international dimension through Action 3 of Erasmus Mundus, establishing an association with 8 higher education centres in non-member countries. Through this action a higher world profile has been achieved, with a reinforced global presence, and associations with higher education institutions in non-member countries have been created. These relationships favour the external mobility of students and academics, creating the Agris Mundus Alliance Sustainable Development.

The characteristics of the programme are thus enriched with the criteria emanating from the Erasmus Mundus programmes: cooperation and mobility within higher education in order to achieve the objectives of improving European higher education and promoting intercultural understanding through cooperation with non-member countries. As a programme, Erasmus Mundus reinforces European cooperation and international links within higher education in the field of Rural-Local Development Project and Programme Management. In this way the IMRD-AM is a masters course open to any professional interested in development project management.

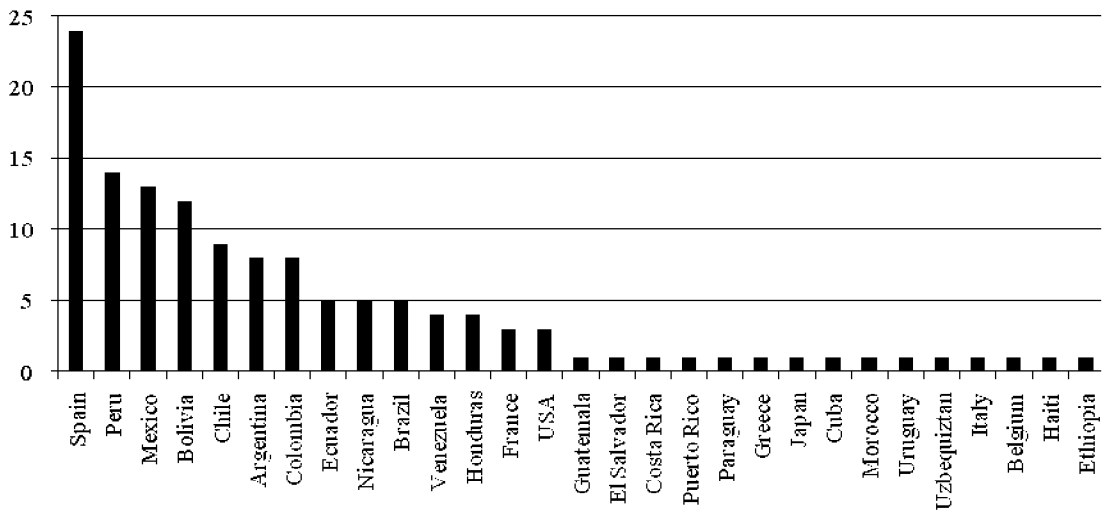

Figure 3: Countries of origin of students on the course

From the academic years 2004-05 to 2009-10, 137 students from 29 different countries (Figure 3) and from very different educational backgrounds (Figure 4) have taken part in the programme. On the programme, in addition to the UPM, five other European Union Universities participate –Agropolis Montpellier CNEARC (France), Wageningen University and Research Centre (Holland), The Royal Veterinary and Agricultural University KVL (Denmark), University of Cork (Ireland), University of Catania (Italy)- and eight Universities from outside the European Union in Africa, Asia and Latin America.

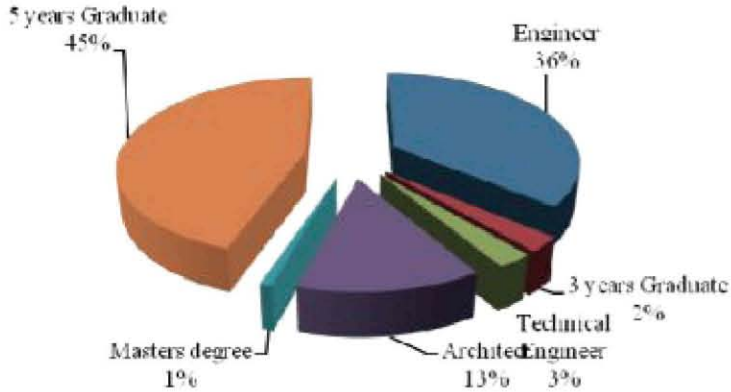

Figure 4: Educational Background of the students on the course

The International Masters in Rural Development – Agris Mundus was presented to the OCDP for verification at the end of 2008, after having followed the stages previously described for the integration of IPMA competences.

The methodological foundations of the process followed for the integration of the international competences in project management are the fruits of a cooperative model based on Project-Based Learning from the experience of the Educational Innovation Group at the UPM, GIE-Project, in conjunction with colaborators from outside the University(De los Ríos, Ros, Ortiz, Fernández, Del Río, & Romera, 2009). GIE-Project has as its main objective the conception of a new educational dimension involving the Final-Year Project as an educational element capable of providing professional experience beforehand, reinforcing cooperative learning (Bartkus K. R., 2001) (Hackett, Martin, & Rosselli, 1998) in order to deal with the competence elements in a gradual way. In this way the educational design of the programme responds to a consistency between the levels of the selected NCB elements in accordance with the summary in Table 6.

Table 6: Summary of the elements covered in the programme and competence levels

Levels	3	4	5	6
Technical competences (20 elements)				
Number of elements covered	0	0	5	15
Average level of the elements covered	6			
Behavioural competences				
Number of elements covered	2	3	4	6
Average level of the elements covered	5			
Contextual competences				
Number of elements covered	2	2	6	1
Average level of the elements covered	4			
Total number of elements covered	4	5	15	22

As it shows, Table 5 collects the "Planning based on the NCB technical competence elements" evaluating each technical competence element according to the experience of the programme application from previous years.

Table 5: Planning based on the NCB and the evaluation of learning objectives for the technical competences

NCB competence element	Learning objective level				Duration (hours)
	3	4	5	6	
Success in Project management				6	40
Parts involved				6	53
Project requirements and objectives				6	35
Risks and opportunities				6	48
Quality				6	39
Project organization				6	49
Work teams			5		49
Problem solving				6	51
Project structures				6	35
Scope and delivery				6	33
Project timescale and phases			5		33
Resources				6	52
Cost and financing				6	36
Purchasing and contracts			5		28
Changes				6	30
Checks and reports			5		33
Information and documentation				6	35
Communication				6	46
Launch				6	32
Closing down			5		32

In the middle of 2009 the verification process was completed and the programme became incorporated within the Registration of Competence Development Programmes, being the first registered programme in Spain.

The programme contains an evaluation system in order to ascertain the evaluation given by participants with respect to content, organization and development. It revolves around two axes: a process of continuous evaluation of an individual nature, and the carrying out of a final participative evaluation session. The final participative evaluation takes place with the objective of completing the process of continuous evaluation, and to discuss and contrast collectively the evaluations carried out individually. In addition the Programme has been the subject of an evaluation by the European Commission, as a case study within the ex-post evaluation of Erasmus Mundus (ECOTEC, 2009). The analysis and reflection regarding proposals and conclusions from this process permit the extraction of a series of "lessons learned" in order to continue improving competence integration and the educational experience in future courses.

In this system there has now been included an anonymous auto-evaluation regarding knowledge of the NCB competence elements in order to check the educational process based on those competences, and discuss and contrast collectively the resulting evaluation. It comprises of two sessions, the first at the start of the course, and the second on completing the educational activities. Table 6 and Figure 5 summarize the results of the evaluation of acquired knowledge by students after this auto-evaluation.

Table 6: Summary of the evaluation of acquired knowledge by students

	Level of knowledge		
TECHNICAL COMPETENCES	INITIAL	FINAL	VARIATION
No knowledge	18%	0%	-18%
Some basic knowledge	42%	18%	-24%
Average knowledge	26%	55%	30%
A good knowledge	14%	27%	13%
BEHAVIOURAL COMPETENCES			
No knowledge	6%	0%	-6%
Some basic knowledge	17%	8%	-9%
Average knowledge	51%	50%	-1%
A good knowledge	26%	42%	16%
CONTEXTUAL COMPETENCES			
No knowledge	36%	2%	-34%
Some basic knowledge	39%	23%	-16%
Average knowledge	20%	50%	30%
A good knowledge	6%	24%	19%

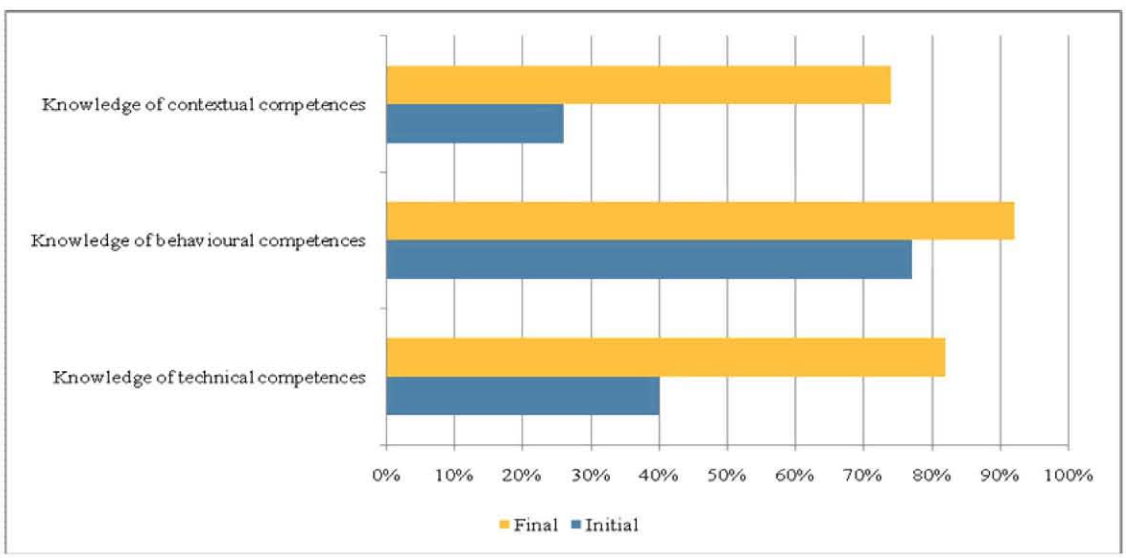

Figure 5: Evaluation of the programme modules

In addition, and based on the assessments carried out during the evaluation process, some general conclusions have arisen, which permit the extraction of a series of "lessons learned" in order to continue improving competence integration and the educational experience in future courses.

The main difficulties encountered are related to competence evaluation, which is complicated by the conception each teacher possesses, the workload which continual evaluation supposes for the teaching staff and because in principle the students are not used to this system of evaluation.

Although the level of student satisfaction is high and all modules have been rated satisfactorily, it is deemed necessary to check the methodologies within some modules in order to improve the integration of behavioural competences. It is generally appreciated that in the majority of modules the time available has been insufficient with respect to the material dealt with, and for that reason it is considered important to carry out a major adjustment when defining the required knowledge.

Figure 6: Workshop with Dr. Hans Knoëpfel, ex –President of the IPMA

The pluridisciplinary character of the participants on the Masters course was highly valued. The enrichment generated by having professionals from diverse disciplines and cultures is considered to be one of the main strong points of the Masters. It is considered useful to have tools available which play to this strength in order to benefit from and take advantage of the positive experience the students have gained through mutual learning. The practicals in companies are valued and it is considered necessary to try and increase these practical activities in order to learn with respect to the competences.

4. Conclusions

In the first place it must be noted that the described experience has not happened spontaneously, but is the result of 20 years of evolution from a simple Project-Based Learning (PBL) in isolated subjects to a wide educational strategy. In that sense PBL has installed itself as the most appropriate educational instrument for the development of competences linking educational activity with the professional environment of the Masters. The learning techniques have as their basis cooperation, active participation and interaction, offering multiple possibilies for the development of technical, contextual and behavioural competences.

A new learning model adapted to the ESHE framework taken from the standards of the International Project Management Association (IPMA) for the Management of rural-local Development Projects has been designed and implemented. This orientation lends a greater degree of solidity to this educational proposal than to others designed from scratch by the University itself, given that it takes account of the reflections and the work carried out by many professionals over a long period of time.

The education has been linked to the certification of professional competences, facilitating the preparation of those receiving the qualification for the Professional Competence Certificate (IPMA), and thus offering participants added value to their Masters degree.

The students within the first intake themselves have appreciated an improvement in their own technical competences (with a 43% improvement), behavioural competences (with a 15% improvement) and especially within the contextual competences (with an assessed improvement of 49%).

As can be seen, the results are very promising with respect to acquired knowledge, but above all they oblige the teaching team and the student to structure the achievement of objectives from a new perspective. Also related to the teaching aspect, the adaptation of educational tools in line with the acquisition of competences will become more and more important.

Subsequent courses will provide new information in order to be able to evaluate the successful development of this experience, and any room for improvement, but we can conclude that the working model which has provided this experience provides an opportunity to advance, driven by educational innovation, in the direction of renewal within university education in the field of rural development, as a strategic line of action within the Technical University of Madrid.

References

Allegre, L., Berlinguer, T., Blackstone, & Rüttgers. (1998). *Sorbonne joint declaration*. Paris, May 1998: Communication, Ministers for France, Germany, Italy and United Kingdom.

Bartkus, K. R. (2001). Skills and Cooperative Education: A conceptual Framework. *Journal of Cooperative Education* 36 (1), 17-24.

Cazorla, A., & De los Ríos, I. (1996). *La enseñanza del desarrollo rural y la planificación en su nueva dimensión: una estrategia metodológica.* Madrid: ICE-UPM.

Cazorla, A., & De los Ríos, I. (1998). *La enseñanza del desarrollo rural: una estrategia metodológica. El Ingeniero Agrónomo en el contexto de la nueva Política de Desarrollo Rural.* Madrid: Fundación Premio Arce.

De los Ríos, I., Cazorla, A., Díaz-Puente, J., & Yagüe, J. (2010). Project–based learning in engineering higher education: two decades of teaching competences in real environments. *Procedia: Social and Behavioral Sciences*, 2 (2), 1368–1378.

De los Ríos, I., Guerrero, D., & Díaz-Puente, J. (2008). *Las competencias profesionales: marco conceptual y modelos internacionales*. Actas II Jornadas Internacionales UPM sobre Innovación Educativa y Convergencia Europea 2008 (INECE'08) .

De los Ríos, I., Ortiz, I., & Díaz-Puente, J. (2009). Project management teaching in engineering higher education: A new perspective for developing competencies. *Selected Proceedings from the 12th International Congress on Project Engineering*, Zaragoza, 418-427.

De los Ríos, I., Ros, A., Ortiz, I., Fernández, A., Del Río, M., & Romera, A. (2009). Modelo cooperativo de aprendizaje y evaluación de competencias personales en dirección de proyectos según el modelo IPMA-NCB. *Actas del 13th International Congress on Project Engineering*. Badajoz: AEIPRO.

ECOTEC (2009). *Ex-post evaluation of Erasmus Mundus. Case Studies*. AGRIS MUNDUS, Sustainable Development in Agriculture. Brussels, Belgium: ECOTEC.

European Commission (1999). *The Bologna declaration*. Bologna, Italy: Communication, European Commission, Directorate-General for Education and Culture.

European Commission. (2000). *A memorandum on lifelong learning*. Memorandum SEC(2000) 1832 . Brusssels: European Commission,.

European Commission (2001). *Making a european area of lifelong learning reality*. Communication COM(2001) 678 final. Brussels: European Commission, Directorate-General for Education and Culture and Directorate-General for Employment and Social A airs.

European Commission (2003). *Conference of Berlin* . Berlin, September 2003: Communication, European Commission, Ministers responsible for Higher Education.

European Council. (2000). *Agree a new strategic goal*. Lisbon, Portugal: Communication DOC/00/8, European Union.

Hackett, R., Martin, G., & Rosselli, D. (1998). Factors Related to Performance Ratings of Engineering Students in Cooperative Education Placements. *Journal of Engineering Education* 87(4), 445-458.

IPMA (2008). *IPMA Certification Yearbook*. IPMA, International Project Management Association. Ed: Werner Schmehr, Hans Knoepfel.

ISO/IEC:17024 (2003). *Conformity assessment. General requirements for bodies operating certification of persons*. Switzerland: International Organization for Standardization.

Sánchez Nuñez, J. (1996). *Los métodos de enseñanza*. Curso superior de formación para la docencia universitaria. Madrid: ICE-UPM.